

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 2, 6, 7, 9, 10, 11, 13, 22, 24 and 28, and cancel claims 4, 17, 21 and 26, such that the claims of the application have the following formulations and statuses:

1. (Currently amended) A method for iterative decoding comprising:

generating an output based on a received coded signal using a first soft-input soft-output device based on a first trellis structure; and
providing the output of the first soft-input soft-output device solely to an input of a second soft-input soft-output device based on a second trellis structure, the second soft-input soft-output device further having an output which is coupled to an input of an iterating decoder which in turn has an output thereof coupled to an input of the second soft-input soft-output device to form a decoding loop, the second trellis structure representing fewer possible device states than the first trellis structure.

2. (Currently amended) The method of claim 1 further comprising:

receiving [[a]] the coded signal from an information transmission medium,
including a communication channel, that is coupled to an input of the first soft-input soft-output device for the generating of a decoded output signal.

3. (Previously presented) The method of claim 2, wherein the communication channel includes a hard drive magnetic disc.

4. (Cancelled)

5. (Cancelled)

6. (Currently amended) The method of claim 1, wherein the first and second soft-input soft-output devices are suited for decoding components of the coded signal corresponding to selected portions of an information transmission medium based on the first trellis structure and the second trellis structure ~~represent factors of a mathematical equation model representative of, respectively, the selected portions of the information transmission medium being combined to form the information transmission medium which extends to the first soft-input soft-output device and includes therein~~ at least a communication channel and a precoder.

7. (Currently amended) The method of operating a turbo decoding circuit for decoding a received signal from an information transmission medium, including a communication channel which can be represented by a mathematical model that is a convolution of two or more equations, one of the two or more equations being a complicated equation, having combined therein at least two selected portions for providing components of the received signal suited for decoding by corresponding first and second SISO devices based on corresponding first and second trellis structures, respectively, such that together the first and second SISO devices are suited for decoding the entire received signal, the method comprising:

processing the received signal with a first SISO device having ~~[[a]]~~ the first trellis structure corresponding to state-outputs of the complicated equation one of the portions;

processing ~~an output~~ outputs of the first SISO device with one or more secondary SISO devices with a secondary SISO device receiving outputs of the first SISO device having the second trellis structure corresponding to state-outputs of each remaining equation of the two or more equations another of the portion, the first trellis structure having fewer possible states than the second trellis structure; and

iteratively decoding ~~an output~~ outputs of the ~~one or more~~ secondary SISO devices
corresponding to state-outputs of each remaining equation.

8. (Previously presented) The method of claim 7, wherein the step of processing the received signal comprises:

inputting the received signal into the first SISO device; and
generating from the first SISO device a soft-output corresponding to the received
signal.

9. (Currently amended) The method of claim 7, wherein the step of processing an output of the first
SISO device comprises:

inputting ~~the output~~ outputs of the first SISO device into ~~one or more~~ a secondary
SISO ~~devices~~ device; and
generating ~~a soft-output~~ soft-outputs based on ~~the output~~ outputs of the first SISO
device.

10. (Currently amended) The method of claim 7, wherein iteratively decoding comprises:

inputting ~~a soft-output~~ output soft-outputs of ~~the one or more~~ a secondary ~~devices~~
SISO device into a de-interleaver; and
passing the de-interleaved soft-outputs to a decoder.

11. (Currently amended) The method of claim 10, wherein iteratively decoding further comprises:

subtracting ~~[[a]] de-interleaved soft-output from the one or more~~ soft-outputs of a
secondary SISO ~~devices~~ device from ~~an output~~ outputs of the decoder to form
~~[[a]] difference~~ value values;
interleaving the difference ~~value~~ values;

inputting the interleaved difference ~~value~~ values into the one or more secondary SISO devices as a secondary input inputs; and
subtracting the interleaved ~~value~~ difference values from the ~~soft-output~~ soft-outputs of ~~the one or more~~ a secondary SISO devices device.

12. (Previously presented) The method of claim 7, wherein iteratively decoding comprises:
rendering soft-outputs in one of four states based the output received from the first SISO device.

13. (Currently amended) An apparatus for turbo decoding coded information received from an information transmission medium including a communication channel, the apparatus comprising:
a first soft-input soft-output device based on a first trellis structure, the first soft-input soft-output device for receiving the coded information at an input thereof; and
a decoder loop having therein at least a second soft-input soft-output device based on a second trellis structure with an output of the second soft-input soft-output device coupled to an input of an iterating decoder also in the decoder loop having in turn an output thereof coupled to an input of the second soft-input soft-output device, the decoder loop for receiving ~~at a device therein~~ an output signal from an output of the first soft-input soft-output device solely at an input of the second soft-input soft-output device and for iteratively generating with the second soft-input soft-output device and the iterating decoder output values at a device therein representative of the received coded information, the first trellis structure having more possible device states than the second trellis structure.

14. (Previously presented) The apparatus of claim 13 wherein the decoder loop further comprises:
a de-interleaver coupling the output of the second soft-input soft-output device to the
input of the iterating decoder; and
an interleaver coupling the output of the iterating decoder to the input of the second
soft-input soft-output device.
15. (Previously presented) The apparatus of claim 13 wherein the communication channel includes
a magnetic disc track in a hard disc drive.
16. (Cancelled)
17. (Cancelled)
18. (Cancelled)
19. (Cancelled)
20. (Previously presented) The apparatus of claim 13 wherein the decoder loop is implemented in
a parallel architecture in a circuit.
21. (Cancelled)
22. (Currently amended) An apparatus for turbo decoding information in a coded signal received
from an information transmission medium including a communication channel comprising:
a first SISO device based on a first trellis structure, the first SISO device for
receiving the coded signal and for generating output bits and reliability bits
corresponding to the coded signal; and

a turbo decoder loop having a plurality of SISO devices each having an output coupled to an input of another and each based on a corresponding loop device trellis structure at least one of which differs from the first trellis structure ~~and~~, the plurality of SISO devices including a decoder device and a second SISO device for receiving the output bits and the reliability bits and having a corresponding loop second SISO trellis structure having fewer possible states than the first trellis structure, the decoder loop for iteratively generating a decoded output signal at [[a]] the decoder device therein corresponding to the coded signal, the information transmission medium having combined therein at least two selected portions for providing components of the coded signal suited for decoding correspondingly by the first and second SISO devices based on the first trellis structure and the loop second SISO trellis structure, respectively, such that together the first and second SISO devices are suited for decoding the entire coded signal.

23. (Previously presented) The apparatus of claim 22 wherein the turbo decoder further comprises:
an interleaver coupling an output of one of the plurality of SISO devices to an input of another; and
a de-interleaver coupling an output of one of the plurality of SISO devices to an input of another.

24. (Currently amended) The apparatus of claim 22 wherein the coded signal [[is]] received is based on information that has been previously stored in ~~from~~ a magnetic recording medium.

25. (Previously presented) The apparatus of claim 22 wherein the first trellis structure characterizing the first SISO device is based on a chosen alphabet and a channel memory length.

26. (Cancelled)

27. (Previously presented) The apparatus of claim 22 wherein the decoder loop is implemented in a parallel architecture in a circuit.

28. (Currently amended) The apparatus of claim 22 wherein the ~~first trellis structure and the loop device trellis structure corresponding to that one of the plurality of SISO devices receiving the output and reliability bits are representative of corresponding factors of a mathematical function representative of a communication channel~~ information transmission medium is coupled to the first SISO device for transmitting the coded signal thereto and the communications channel includes a hard drive magnetic disc.